5.8.2 Video Bus Receiver

The following specifications apply to the interface of a video receiving device to the V1, V2, V3, and V4 pairs. The interface requirements are identical for all video media. All parameters apply over the frequency range of 0 Hz to 5.0 MHz unless otherwise stated.

5.8.2.1 Video Channel Input Impedance

The video medium receiver shall have an input impedance, measured at the device video media terminals, between 3K ohms and 1M ohms. The input impedance shall be between 1.5K ohms and 1M ohms between each video medium connector pin and the CMR line. These conditions shall be met in the power-off or power-on condition. This impedance is measured at the video medium terminals of the AV Bus connector with a differential sine wave amplitude of 1.0V p–p??.

5.8.2.2 Received Signal Conditions

The video medium receiver shall operate normally with a received signal range of 1.0 volts p-p maximum while in the presence of a common mode voltage of 6.0 volts ±TBD volts from either video terminal to reference GND (as shown in Figure 5.13), and a DC offset voltage of ≤ ±TBD between video terminals.

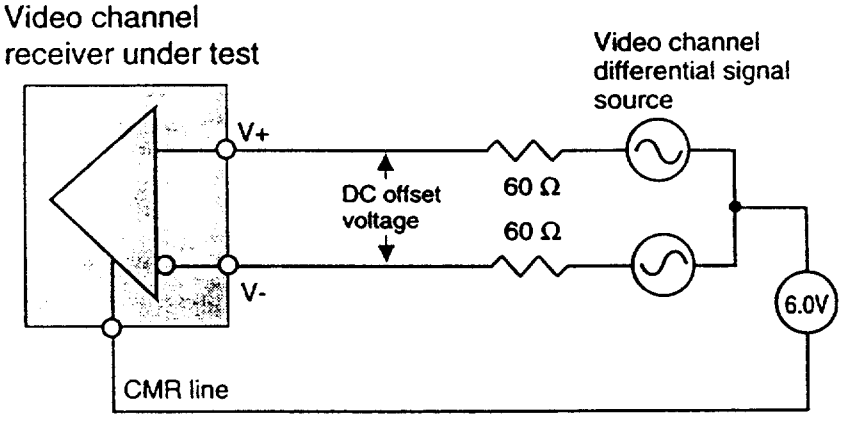


Figure 5.13 Video receiver common mode test circuit

5.8.2.3. Common Mode Range

The video receiver will have a common mode rejection ration ≥ 35 dB measured at 4 MHz.

5.8.2.4 Media Isolation

Any video medium receiver will provide a minimum of 80dB of signal isolation between the connected medium and all other AV bus media and all other non-AV bus signals in or out of the AV device.

5.9 Common Mode Reference Line

The common mode reference line medium contacts of each AV device will be internally connected together and will connect to the device circuit common through an internal series resistance of 100 ohms??

5.10 Device Failure Modes

Detecting the cause of a bus failure due to a failing device or bad connection is very difficult in a bus where all devices are connected in parallel. For this reason, extra precaution should be taken to insure the design of each device meets the required failure mode specifications.

5.10.1 Electrical Failure

A device which experiences an electrical failure to render the device inoperative should fail in an INFERIOR state on the bus. No device failure will leave the control channel Physical Layer in a low impedance state on the bus.

5.10.2 Control Channel Jabber Inhibit

The control channel Physical Layer of each device shall contain a jabber inhibit section which shall monitor the length of time the transmitting element is active. If a node asserts the SUPERIOR state continuously for a period longer than 1000 unit symbol times then the node must disconnect from the network or revert to a state equivalent to the INFERIOR state for a period greater than 10 seconds before attempting to re-connect The jabber inhibit shall then resume monitoring. This sequence may then be repeated..

6 AV Media Node 0 Requirements

6.1 Control Channel Routing

A Control channel router device may be attached to the AV network for routing of control channel messages to any other media including additional AV networks. A router device must meet all Physical Layer requirements of an AV device as described in section 5 of this document. Complete specifications for CEBus control channel router devices are given in IS-60.03 Part 8.

A router may attach to the AV network at any point using a network connector. It may exist as a separate device or may be built into an AV device.

6.2 Data Channel Bridging

AV data channels may be bridged between AV media on two different AV networks, or between AV media and another CEBus media (PL, CX, etc.). A data channel bridge must meet all data channel Physical Layer requirements of an AV device and must meet all signal frequency and level requirements for the data channels it bridges on each media. Complete specifications for data channel bridges are given in IS-60.03 Part 8.

A data channel bridge may attach to the AV network at any point in the network using a network connector. It may exist as a separate device or may be built into an AV device.

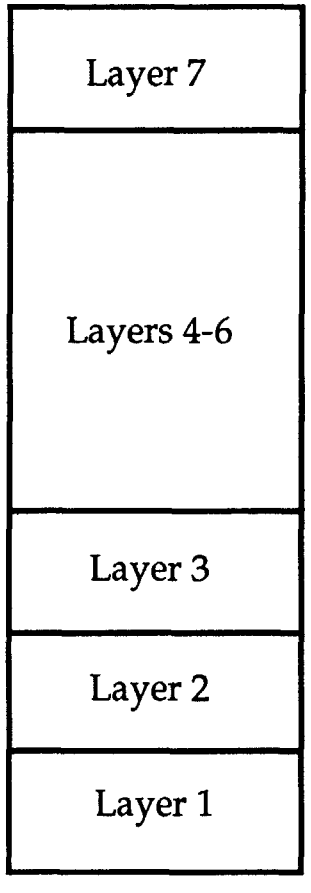
REFERENCES

Integrating IS-60 in IS-105

- IS-105 decoder interface uses IS-60 (CEBus) protocol in all four OSI layers implemented
- If IS-105 includes IS-60, decoder interface can serve as a foundation for CEBus home automation
- Adoption of IS-105 with underlying IS-60 provides significant competitive and cost advantages for the proliferation of CEBus home automation over other competing systems

IS-105 Control Bus Protocol

Draft 105.2, Section 2: "The control bus utilizes the CEBus specification which has a layered protocol model."



Application Layer - IS-105.2, Section 1.2: "Decoder Interface control bus is implemented using...EIA IS-60 CEBus...application layer including CAL (Common Application Language)."

Intermediate Layers - not specified as part of IS-105 or IS-60

Network Layer - IS-105.2, Section 1.2: "Decoder Interface control bus is implemented using ... EIA IS-60 CEBus... network layer."

Data Link Layer - IS-105.2, Section 1.2: "Decoder Interface control bus is implemented using...EIA IS-60...data link layer."

Physical Layer - IS-105.1, Section 5.6.2: "Messages on the control line follow the protocol specified by EIA IS-60 (the CEBus standard)."

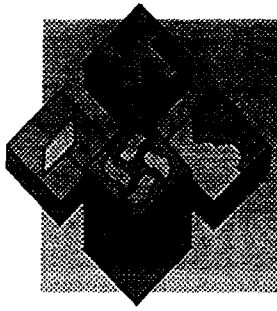
Based System

- CEBus is an extensible specification - additional commands can be added as they are needed through the definition of new CAL objects
- There is no defined set of CAL application-specific objects that products must contain in order to be CEBus compliant
- Mandating IS-105 facilitates extensions of decoder interface products to home automation through embedding other CAL objects

Thermostat	Television	Light Switch
(Contains CAL objects for HVAC)	(Contains CAL objects for A/V)	(Contains CAL objects for lighting)

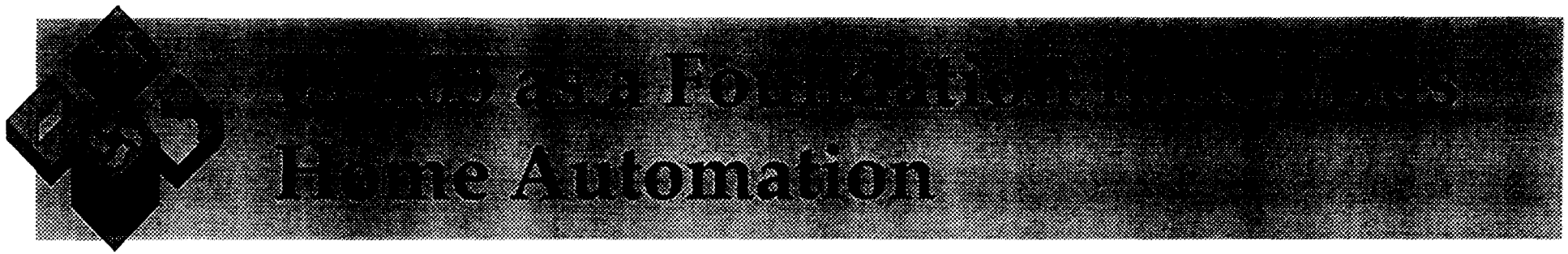
These are <u>all</u> CEBus products

- **Intelligent IS-105 to CEBus power line module (assuming no IR pass-through)**
  - Low-cost AC wall-mounted device which translates CAL commands between IS-105 twisted pair control bus and power line
  - Intelligent module would recognize commands on one media and translate them to commands and actions on the other media
  - Application example: Security system on power line determines that there is a visitor at the front door and commands A/V system to display camera's image of the visitor on the TV



Home Automation

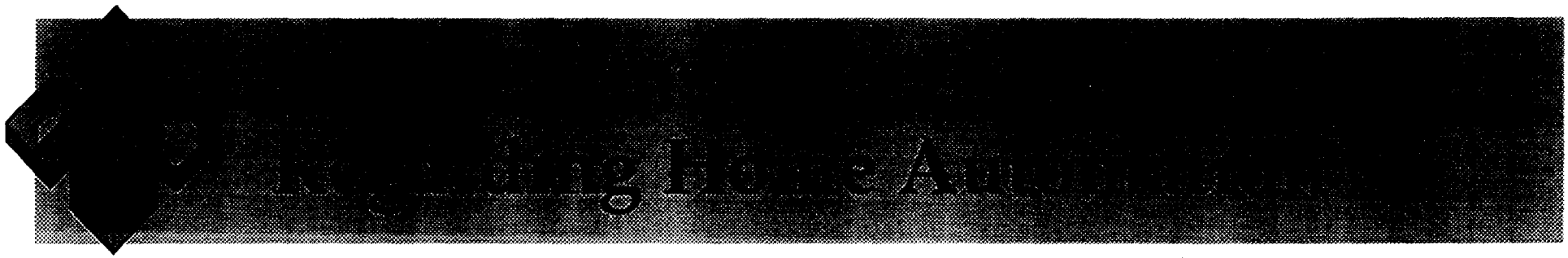
- **IS-105 to CEBus power line router (assuming IR pass-through)**
  - In a trivial fashion, commands from an IR remote control are received directly by this router module without translation and sent on to communicate with home appliances
  - Simpler and lower cost than intelligent module - no command translation
  - Application example: User interacts with the IR remote control and TV display and is able to control, monitor and program appliances on the power line media through the router
  - These home automtation remote controls could be marketed separately or additional home control commands could easily be added to existing remote controls



- **"Enhanced" IS-105 products**
  - There is no requirement that IS-105 products contain only those CAL contexts and objects required to implement IS-105
  - Manufacturers could add home control CAL objects as part of their standard product - a small amount of memory might be required to add to the embedded microcomputer implementing IS-105
  - TV control and monitoring of CEBus home appliances could be a value-added marketing feature
  - Could use simple IS-105 to CEBus power line router with or without IR pass-through

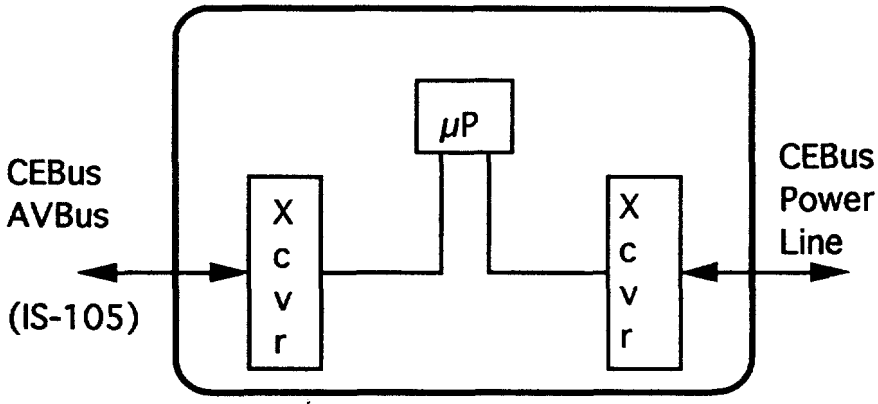
Home Automation

- **"Upgradable" IS-105 products**
  - Non-volatile memory (e.g. EEPROM or flash) could be used to upgrade products with home control CAL objects in the field
  - Cable operators could download and sell CAL home control features easily over their networks to their IS-105 set-back converters
  - Could be sold as a value-added feature on a "pay-per-view" basis
  - Could use simple IS-105 to CEBus power line router with or without IR pass-through



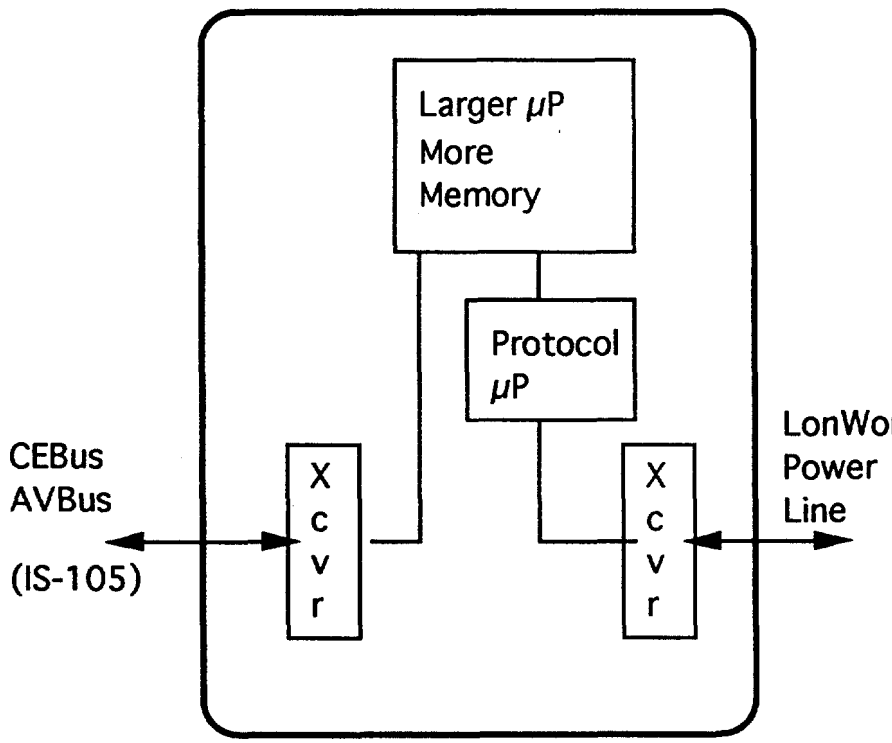
- **Adoption of IS-105 with underlying IS-60 provides significant competitive and cost advantages for the proliferation of CEBus home automation over other competing systems**
  - Translation from IS-105 to CEBus power line is accomplished through a simple and low-cost CEBus router
  - Translation from IS-105 to another home automation protocol, such as the LonTalk® protocol, requires a more expensive and complex protocol converter
    - Cost penalty will be borne by the consumer for the first home automation purchase

CEBus to CEBus Router



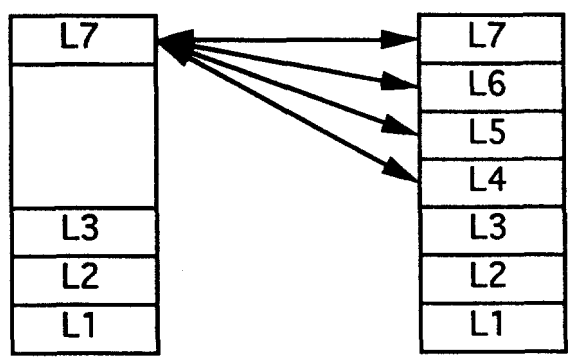
Simple bridge and repeater

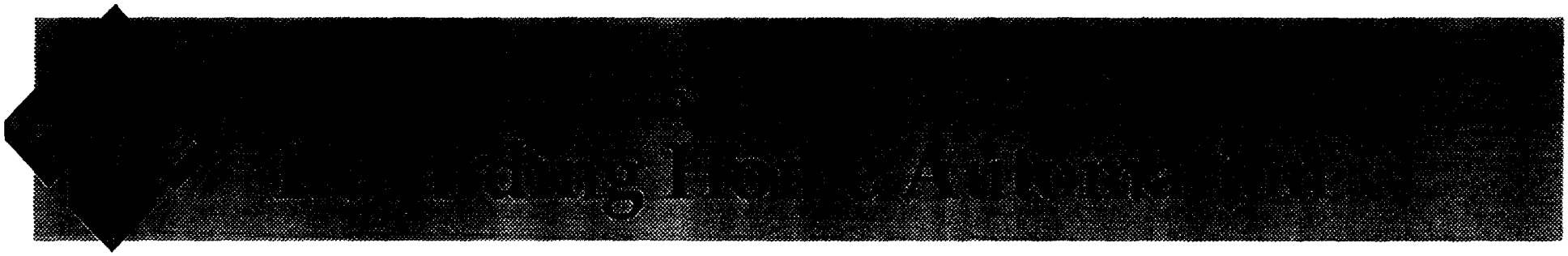
CEBus to LonWorks Router



Protocol Conversion Complexities

- Address translation
- Layer 7 translation
- Network management
- End-to-end services
  - Acknowledgments
  - Authentication
  - Priority
- Speed mismatch
  - Larger buffers





- **Adoption of IS-105 with underlying IS-60 provides significant competitive and cost advantages for the proliferation of CEBus home automation over other competing systems**
  - CEBus and LONWORKS® technology power line transceivers and signalling schemes are incompatible and mutually destructive
    - Once CEBus power line is established in a home, LONWORKS power line communication is not possible
    - Power line media may extend to neighboring homes - thus, CEBus home automation incumbency would be defined even for undecided neighbors